

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

I D S

(11) Publication number:

0 353 454
A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 89111607.1

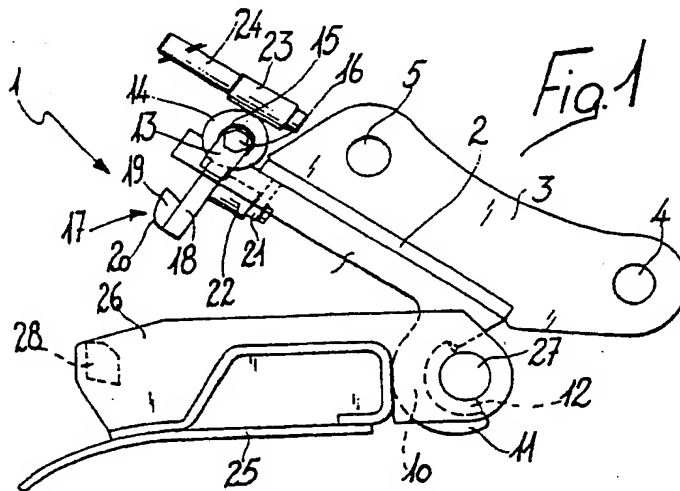
(51) Int. Cl.4: E02F 3/40 , E02F 3/96 ,
E02F 9/22

(22) Date of filing: 26.06.89

(30) Priority: 20.07.88 IT 4164088
28.10.88 IT 4170488(43) Date of publication of application:
07.02.90 Bulletin 90/06(84) Designated Contracting States:
AT CH DE FR GB LI NL(71) Applicant: V.T.N. BENNE S.r.l.
Via A. Volta, 5
I-36025 Noventa Vicentina (Vicenza)(IT)(72) Inventor: Vaccaro, Tiberio
Via Mulinello
I-36025 Noventa Vicentina(IT)(74) Representative: Modiano, Guido et al
MODIANO, JOSIF, PISANTY & STAUB
Modiano & Associati Via Meravigli, 16
I-20123 Milano(IT)

(54) Quick mount particularly for fixing buckets to earth-moving machines.

(57) The quick mount according to the invention is particularly adapted to fix buckets of various sizes and types to earth-moving machines. The mount comprises a support (2) which can be fixed to the end of the operating arm (6) of an earth-moving machine; downwardly extending elements (10) are welded to the plate and are provided with a curved end (11) adapted to insert between the upper part of a bucket (25) and a transverse pivot (27) thereof. On the opposite side, the support bears independently or controllably actuated means (17) for coupling to the bucket.



Xerox Copy Centre

EP 0 353 454 A1

QUICK MOUNT PARTICULARLY FOR FIXING BUCKETS TO EARTH-MOVING MACHINES

The present invention relates to a quick mount particularly for fixing buckets to earth-moving machines.

The need to replace buckets in any moment, for example during excavations or earth-moving work with earth-moving machines equipped with such buckets, is known.

According to the kind of work and to the room available, different buckets are in fact normally provided which can be interchangeably associated with a same earth-moving machine.

Current types of mount between buckets and earth-moving machines comprise the insertion of dowels or pins in complementary holes provided on protrusions defined on the two parts to be associated.

Though they achieve their specific purposes, such kinds of mount are not free from disadvantages, among which considerable difficulty in achieving the correct positioning of the earth-moving machine with respect to the bucket in order to insert the fixing dowels or pins.

Two operators are furthermore always required to perform the mount: one for maneuvering the earth-moving machine, the other one for inserting said dowels.

The aim of the present invention is to eliminate the disadvantages described above in the known art by providing a quick mount capable of achieving the substantially immediate replacement of buckets of various sizes and kinds on earth-moving machines.

A consequent primary object is to provide a quick mount, particularly for fixing buckets to earth-moving machines, which allows the machine operator to perform the replacement operation autonomously.

Another important object is to provide a quick mount characterized by easy use and complete absence of maintenance.

Another object is to provide a quick mount which can be easily installed and adapted to current earth-moving machines and to current kinds of buckets.

Not least object is to provide a quick mount which can be manufactured at low costs with current production systems.

This aim, these objects and others which will become apparent hereinafter are achieved by a quick mount, particularly for fixing buckets to earth-moving machines, characterized in that it comprises a support which is fixable to the end of the operating arm of an earth-moving machine, elements with a curved end extending downwards from said support on one side, said curved end

being adapted to insert between the upper portion of a bucket and a transverse coupling pivot thereof and, on the opposite side, means for coupling to the bucket.

Further characteristics and advantages of the invention will become apparent from the detailed description of two embodiments, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a side view of a mount according to a first aspect of the invention, in a first step of the mutual fixing of the parts;

figure 2 is a view of the mount of figure 1 after the parts have been mutually fixed;

figures 3, 4 and 5 are perspective views which illustrate the various steps of the fixing of a bucket to the arm of an earth-moving machine by means of the quick mount of figure 1;

figure 6 is a side view of a mount according to a second aspect of the invention, in closed configuration;

figure 7 is a partially sectional front view of the part of the mount of figure 4 which is associated with the earth-moving machine;

figure 8 is a perspective view of the mount of figure 1 in half-open condition;

figure 9 is a front view of the mount of figure 6 in closed condition;

figure 10 is a perspective side view of the mount of figure 6 in closed configuration.

With reference to figures 1 to 5, a quick mount according to the invention is generally indicated, in a first embodiment, by the reference numeral 1 and comprises a support constituted by a metallic plate 2; two first parallel wings 3, made of thick sheet metal, are upwardly and longitudinally welded orthogonally to said plate; said wings are provided, at their ends, with coaxial pairs of transverse holes 4 and 5 for fixing to the operating arm of an earth-moving machine.

As illustrated in figures 3 to 5, the end of the arm 6 is conveniently articulated between said holes 4, while the end of a lever system 7 actuated by a hydraulic piston 8 is articulated between said holes 5.

Two second parallel wings 9, made of thick sheet metal and having a substantially elongated rectangular profile, are longitudinally welded below said plate 2; an element 10 extends downwards from an end of each of said second wings 9 on the side articulated to the arm 6, and has an end 11 which is outwardly curved in the shape of an arc of a circle.

A half-shell 12, conveniently made by diametrically cutting a metal tube, is transversely welded

between the two ends 11 of the elements 10.

A transversely perforated element 13 for the pivoting of a tubular element 14 is upwardly welded in a substantially orthogonal position at the end of each second wing 9 which is arranged opposite to the articulation of the arm 6.

The rotoidal coupling between the pair of elements 13 and the tubular element 14 is achieved by inserting, in appropriate end seats of said element 14, elastic means 15 of the kind commonly termed "silent block" and by then inserting axially to said elastic means a threaded pin 16 provided with a locking nut.

A hook 17 is welded radially to said tubular element 14; said hook is substantially composed of a metal plate 18 which has a metal strip 19 welded to its free end on its outer side; said strip has an outer rounding 20 which in practice joins the two surfaces which are not adapted to be coupled.

Said hook 17 is kept arranged downwards and substantially orthogonal to said plate 2 as it is rigidly associated by means of bolts to an element 21 which protrudes downwards from said plate 2.

An elastic rubber element 22 is interposed between said hook 17 and the element 21; its compression allows said hook a certain degree of rotation about the pivot 16.

A bush 23 is transversely welded on the tubular element 14 in a position diametrically opposite to said hook 17; the end of a lever 24 can be inserted in said bush, said lever allowing the above mentioned rotation when manually actuated.

The quick mount 1 can be associated with the upper portion of a bucket 25 which is conveniently provided with a pair of third longitudinal wings 26 made of thick sheet metal, between which a large cylindrical pivot 27 is transversely welded on the side of said elements 10; the outer surface of said pivot 27 is shaped complementarily to the inner surface of said half shell 12.

A crosspiece 28 is welded to the bucket 25 on the side of said hook 17; said crosspiece is upwardly chamfered and downwardly shaped complementarily with respect to the coupling regions of said hook.

The various steps of the fixing of a bucket to an earth-moving machine are illustrated in figures 3, 4 and 5, which illustrate a first step of approach of the operating arm 6 to the bucket 25, with the mount 1 in a substantially vertical position due to the traction exerted on the lever system 7 by the hydraulic piston 8.

A second step consists in inserting the half-shell 12 between the pivot 27 and the upper part of said bucket 25.

By subsequently actuating the lever system 7 by means of the hydraulic piston 8, the mount 1 is rotated about the pivot 27 until the rounded portion

20 of the hook 17 makes contact with the chamfered portion of the crosspiece 28.

As said rotation of the mount 1 continues, the crosspiece 28 forces the hook 17 to rotate about its articulation pivot until it stably engages.

If the bucket 25 is to be released from the arm 6, it is sufficient to insert the lever 24 in the bush 23 and to rotate the hook 17 until it disengages from the crosspiece 28, subsequently performing the above described operations in reverse sequence.

With reference now to figures 6 to 10, a quick mount is generally indicated by the reference numeral 101 in a second embodiment, and comprises a support constituted by a metal plate 102 which can be fixed to the operating arm of an earth-moving machine; two first parallel wings 103, made of thick sheet metal, are longitudinally welded below said plate; an element 104 extends downwards from an end of each of said wings 103 and has an end 105 which is outwardly curved in the shape of an arc of a circle.

A half shell 106, conveniently obtained by diametrically cutting a metal tube, is welded transversely between the two ends 105 of the elements 104.

The curved ends 105 are associable with the upper portion 107 of a bucket, not illustrated in the figures, and the portion 107 has a pair of second longitudinal wings 108 made of thick sheet metal, between which a large cylindrical pivot 109 is welded transversely; the outer surface of said pivot is shaped complementarily to the inner one of said half-shell 106.

At the opposite end of said elements 104, the two first parallel wings 103 widen in the shape of a lug and have a pair of coaxial holes 110, between which a tubular element 111 is inserted and welded; said tubular element contains a double hydraulic cylinder 112.

The stems 113 of the cylinder 112 are coaxially screwed onto the bottom 114 of respective cup-like bushes 115 which are slidable between the outer walls of said cylinder 112 and the inner walls of the tubular element 111.

The cup-like bushes 115 are adapted to insert in tubular bushes 116 welded coaxially in holes provided on said pair of second longitudinal wings 108.

Said cylinder 112 is actuated by coupling to centrally located terminals 117 of a manual hydraulic pump, not illustrated in the figures, conveniently coupled to the support 102.

The various steps for mounting a bucket to an earth-moving machine by means of the mount according to the second aspect of the invention, consist in a first step of approaching the support 102 in a substantially vertical configuration, and

then in a second step of inserting the half-shell 106 between the pivot 109 and the upper portion 107 of the bucket.

In a third step, the support 102 is rotated about the pivot 109 until it rests against the upper portion 107 of the bucket, consequently arranging the double hydraulic cylinder 112 coaxial to the bushes 116.

In a final step, the cylinder 112 is actuated, making the bushes protrude from the cup 115 and inserting them in the tubular bushes 116.

The same steps are naturally repeated in reverse to uncouple the bucket.

The particular kind of pivoting obtained with the aid of cup-like bushes 115 screwed to the stems 113 of the cylinder 112 allows their rapid replacement.

Said bushes are in fact subject to considerable wear, since they are heavily stressed during the use of the bucket.

From what has been described and illustrated above it is therefore evident that the invention brilliantly achieves the intended aim and objects, a mount having been provided which allows the substantially immediate replacement of buckets on earth moving machines.

The speed and ease of the coupling and uncoupling operations allows their execution on the part of a single operator, in particular the operator of the earth moving machine.

The invention is furthermore composed of simple elements which can be mutually assembled without difficulty, and this makes it constructively convenient and competitive as regards its sales price.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, so long as compatible with the contingent use, as well as the dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Quick mount, particularly for fixing buckets to earth-moving machines, characterized in that it

comprises a support (2, 102) which is fixable to the end of the operating arm (6) of an earth moving machine, elements (10, 104) with a curved end (11, 105) extending downwards from said support on one side, said curved end being adapted to insert between the upper portion of a bucket (25) and a transverse coupling pivot (27, 109) thereof and, on the opposite side, means (17, 112) for coupling to the bucket.

2. Quick mount according to claim 1, characterized in that said means for coupling to the bucket is an independently actuated means comprising a hook-like element (17) articulated to said support, keeping a downwardly directed position by virtue of elastic means (22) which cooperate with fixing means (21), said means for coupling to the bucket being disengageable from a transverse element, which protrudes from the upper portion of said bucket, by means of a rotation in contrast with the action of said elastic means (22).

3. Quick mount according to claim 1, characterized in that said means for coupling to the bucket is a controllably actuated means comprising a double hydraulic cylinder (112) fixed to said support, the stems (113) of said cylinder being adapted to insert in corresponding coaxial holes provided on wings which extend from said bucket, said cylinder being actuated by a hydraulic pump coupled to said support (102).

4. Quick mount according to claim 1, characterized in that said support is constituted by a plate (2), above which two first parallel wings (3) are welded longitudinally in a substantially orthogonal configuration, said wings having, at their ends, coaxial pairs of transverse holes (4, 5) for fixing to said operating arm of an earth-moving machine, the end of said arm and the end of a lever system (7) actuated by a hydraulic piston (8) being articulated between said holes.

5. Quick mount according to claim 1, characterized in that two second parallel wings (9) are welded longitudinally below said plate, one of said elements (10) with curved ends extending downwards from an end of each of said wings on the side of articulation to said operating arm, the shape of said end being an outwardly directed arc of a circle.

6. Quick mount according to claim 5, characterized in that a half-shell (12) is welded transversely between the curved ends (11) of said elements (10), said half-shell and said curved-end elements being insertable between the upper portion of a bucket and said transverse pivot thereof, which is provided between a pair of third longitudinal wings which extends therefrom.

7. Quick mount according to claims 1 and 2, characterized in that said hook-like element (17) is radially welded to a tubular element (14) articulated

between pivoting elements which extend substantially orthogonally upwards from said plate at the end opposite to the articulation to said operating arm, the rotoidal coupling being provided by inserting elastic means (15) in appropriate end seats of the tubular element and by then inserting axially to said elastic means a threaded pivot (16) with a locking nut.

5

8. Quick mount according to claims 1, 2 and 7, characterized in that said hook-like element (17) is substantially composed of a plate (18), with a strip (19) welded to its free end, on the outer side, said strip having a chamfering which comprises the two sides not suitable for coupling.

10

9. Quick mount according to claims 1, 2, 7 and 8, characterized in that said hook-like element (17) keeps a downwardly directed position as an effect of said fixing elements, which protrude downwards from said plate and are fixed to said hook like element by bolting, said elastic elements (22) being interposed between said fixing elements (21) and said hook-like elements (17).

15

20

10. Quick mount according to one or more of the preceding claims, characterized in that said transverse element which protrudes from the upper portion of said bucket (25) is composed of a crosspiece (28) which is upwardly chamfered and downwardly shaped complementarily to the coupling regions of said hook-like element.

25

11. Quick mount according to claims 1 and 3, characterized in that said double hydraulic cylinder (112) is accommodated inside a tubular element (111) inserted between the coaxial holes (110) provided on parallel wings (103) which extend from said support, said tubular element being welded to said wings.

30

35

12. Quick mount according to claims 1, 2 and 11, characterized in that said stems (113) are screwed coaxially to the bottom (114) of cup-like bushes (115) slidable on said double hydraulic cylinder, to which they are coaxial.

40

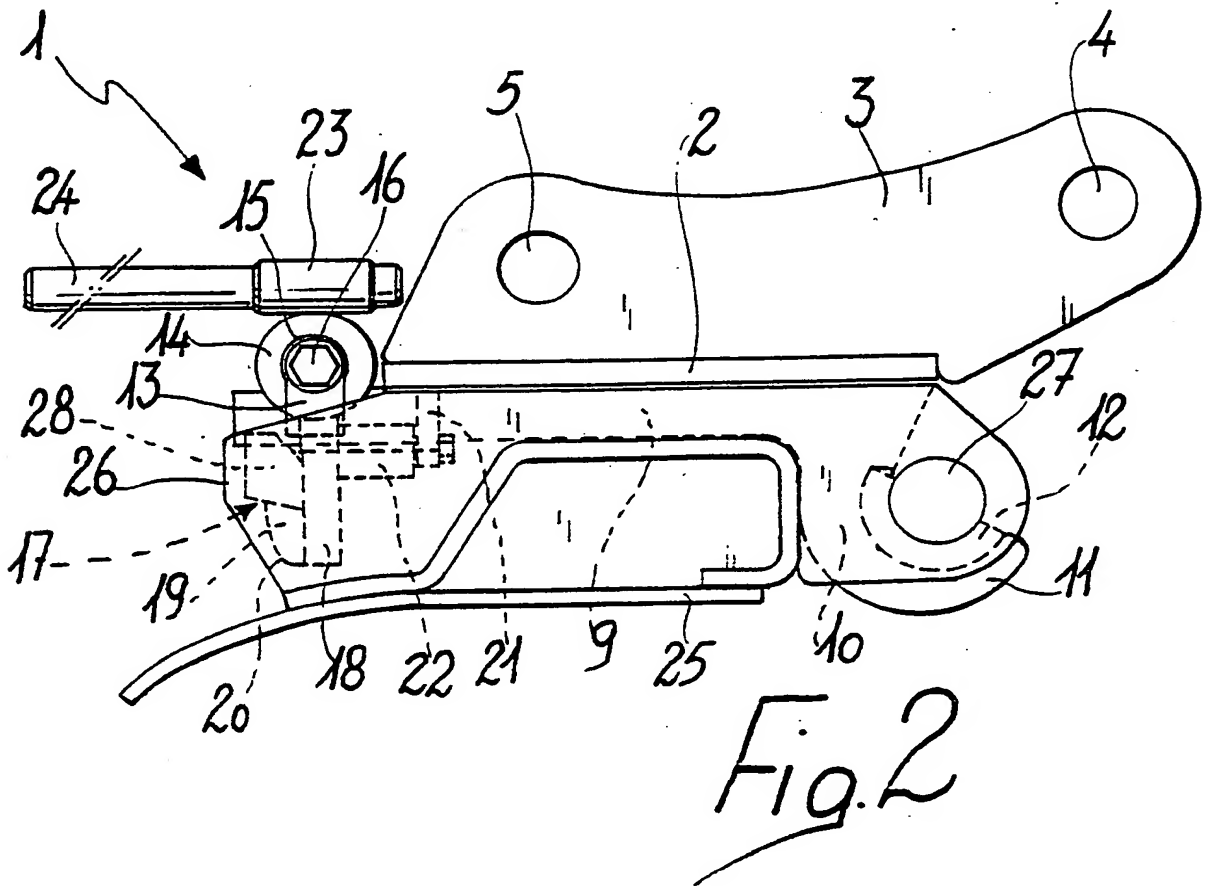
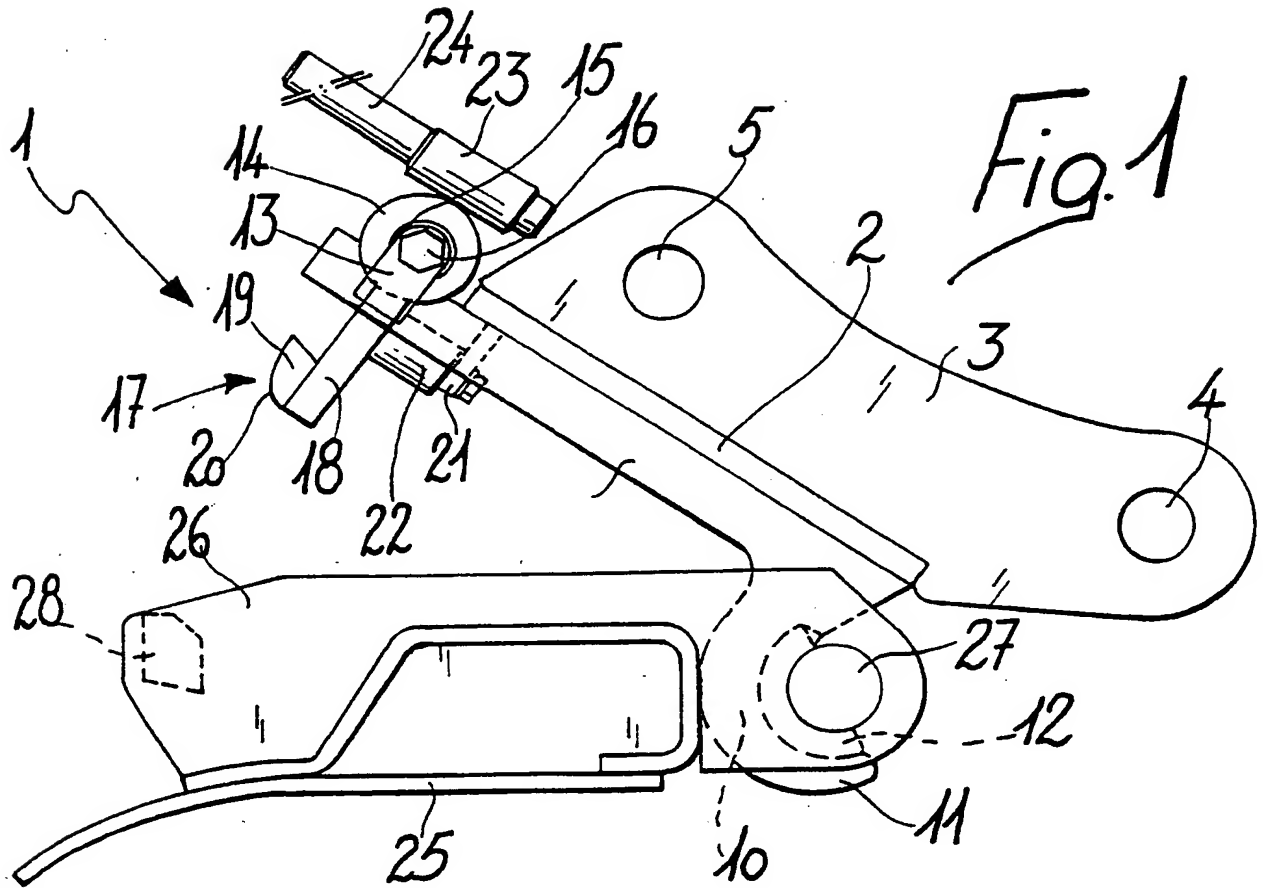
13. Quick mount according to claims 1, 3, 11 and 12, characterized in that said coaxial holes provided on the wings which extend from the bucket have tubular bushes (116) welded internally thereto.

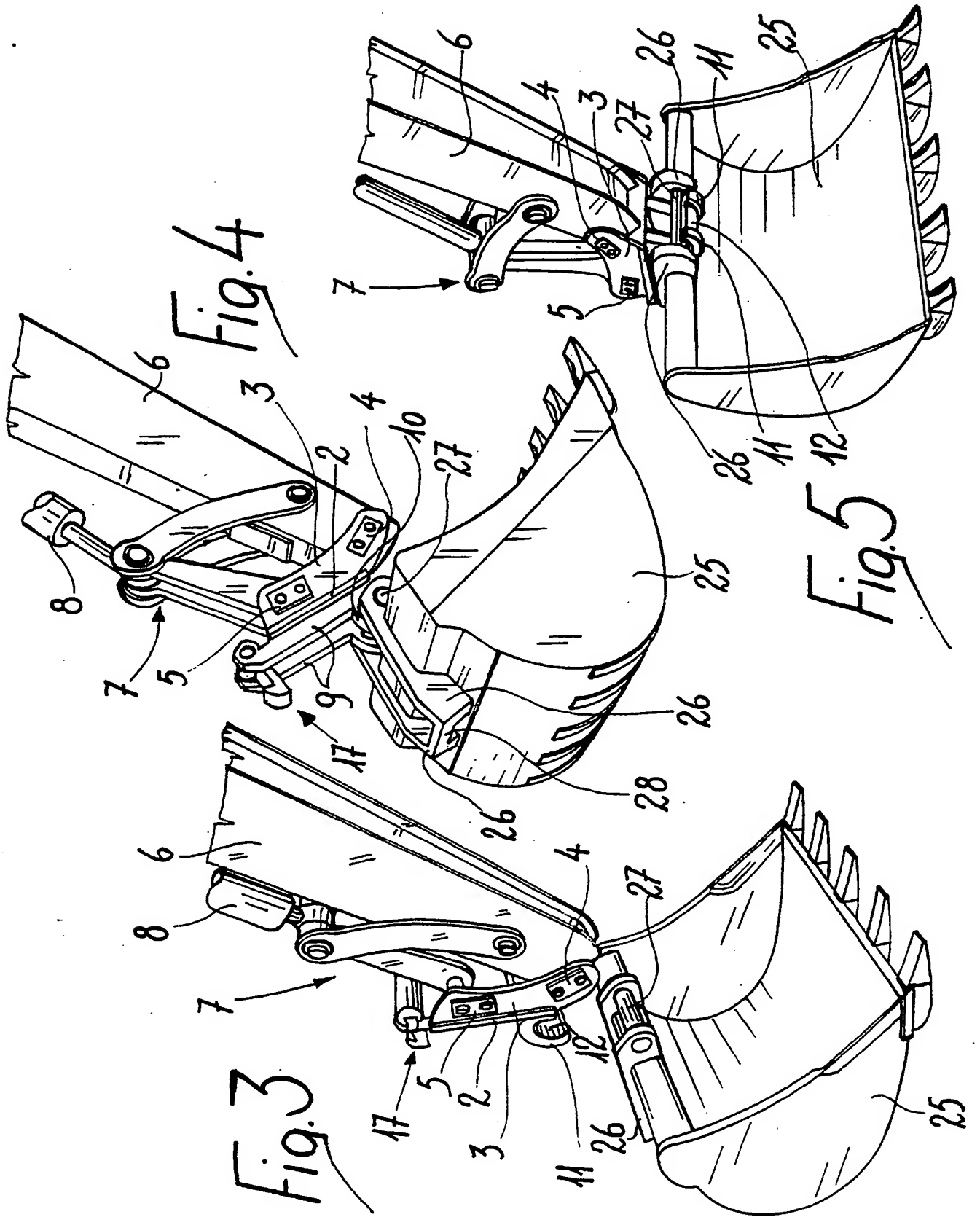
45

14. Quick mount according to claims 1 and 3, characterized in that said pump coupled to said support is a manual pump.

50

55





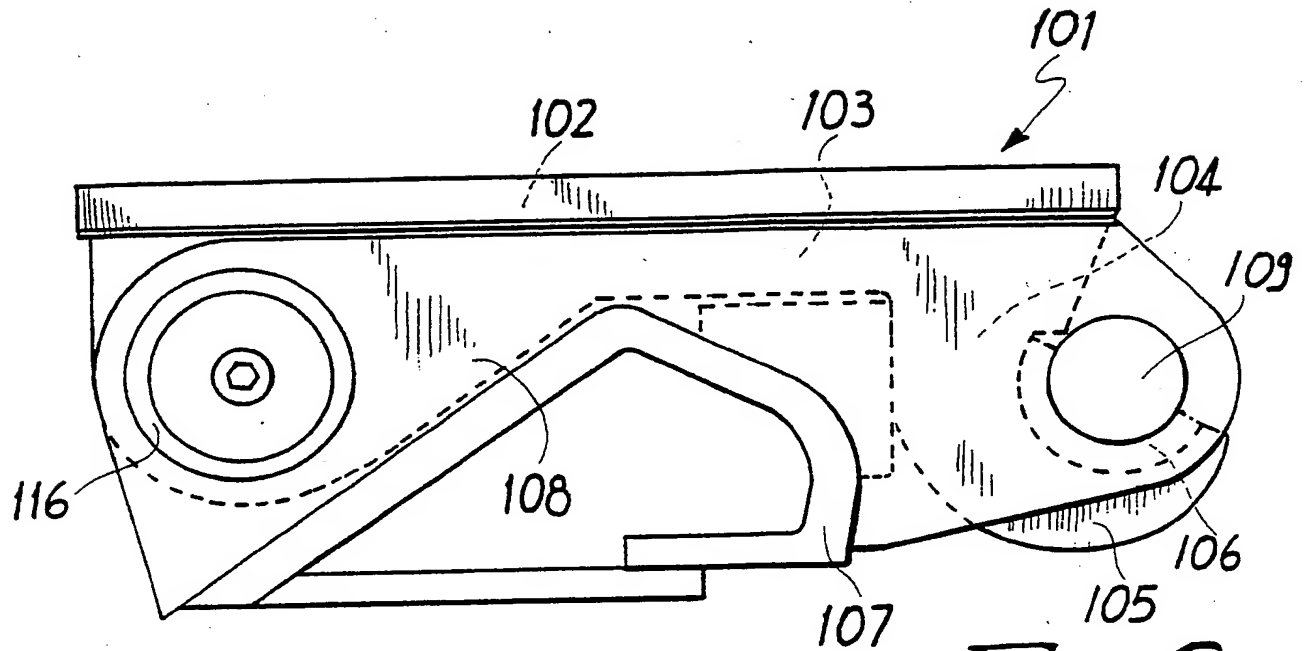


Fig. 6

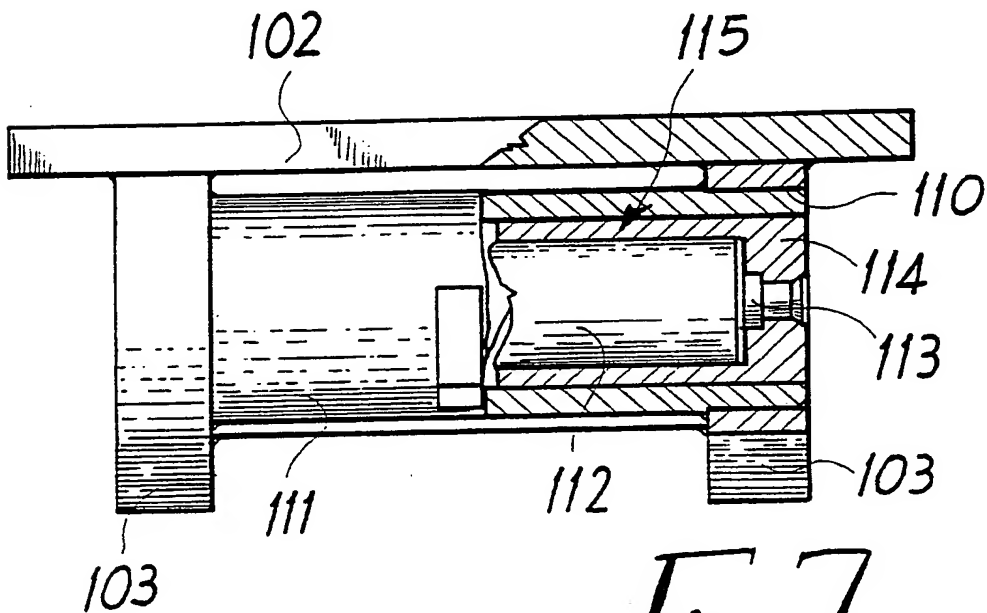


Fig. 7

Fig. 8

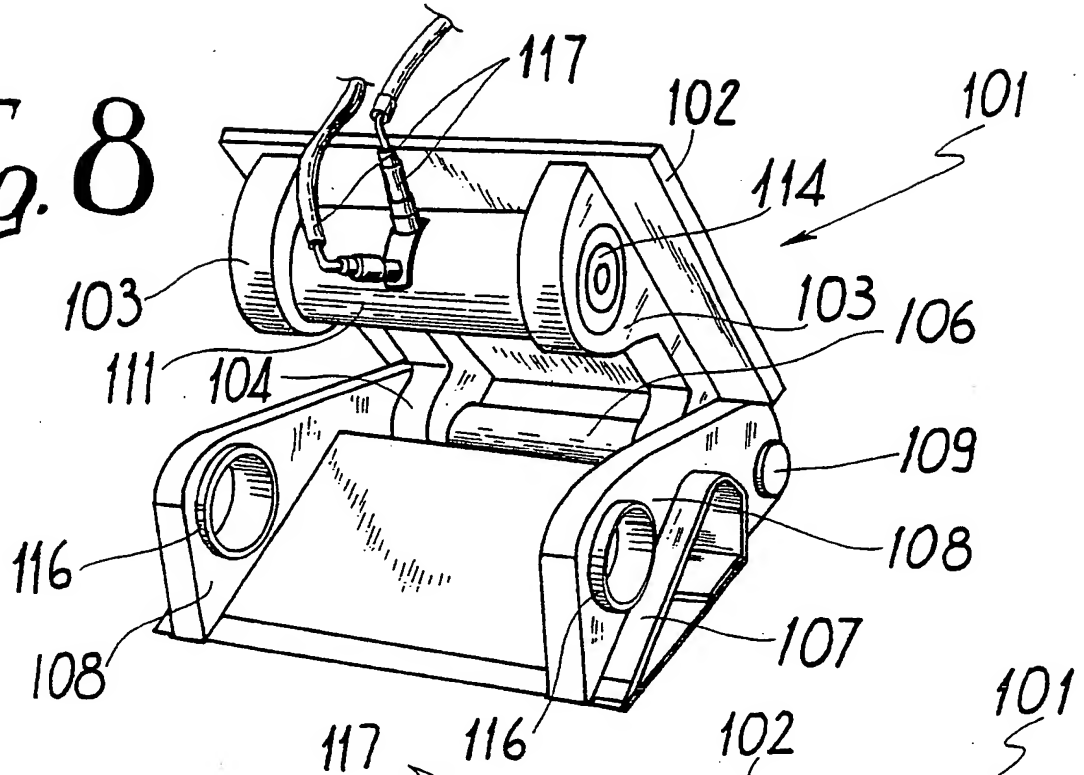


Fig. 9

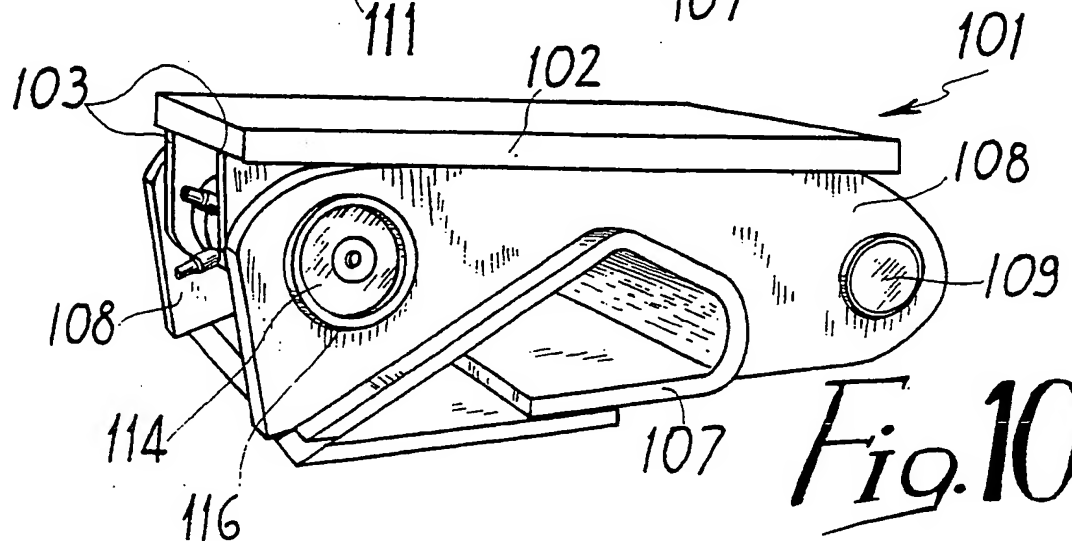
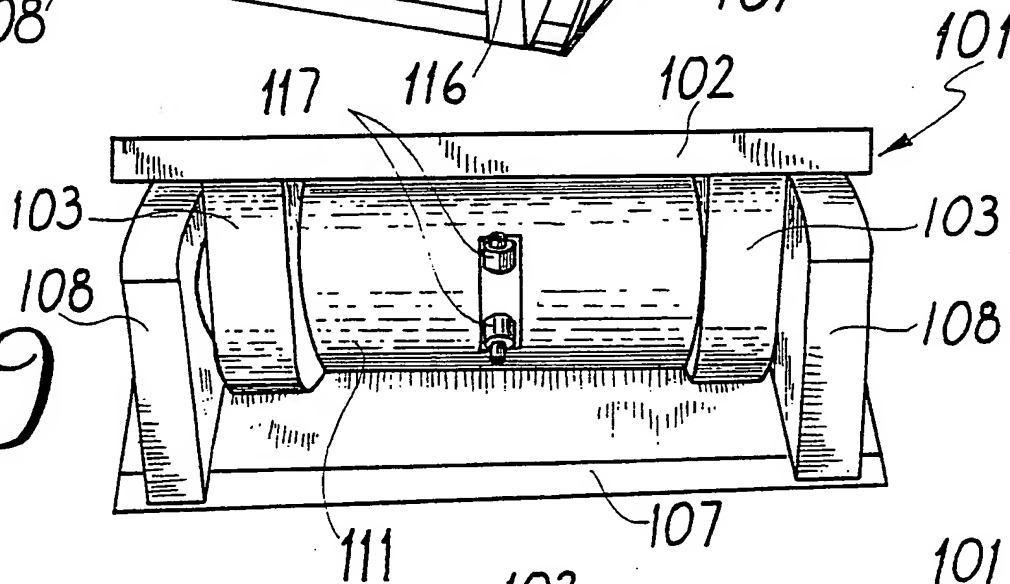


Fig. 10



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 11 1607

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-4 355 945 (PILCH) * Column 2, line 34 - column 3, line 6; figures 1-2C *	1,2	E 02 F 3/40 E 02 F 3/96 E 02 F 9/22
A	---	3	
X	US-A-4 480 955 (ANDREWS et al.) * Figures 1-3 *	1,2	
A	---	3	
X	GB-A-2 205 299 (BALEMI) * Abstract; figures 1,2 *	1,2	
X	US-A-4 643 631 (MAURER et al.) * Figures 1-4 *	1	
A	AT-B- 327 096 (SCHÖBERL) * Claims 1,2; figures 1,2 *	1,3,4, 11,13	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 02 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24-10-1989	Examiner ANGIUS P.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			